UNITED STATES PATENT OFFICE

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PROCESS FOR OBTAINING TRANSPARENT EFFECTS ON REGENERATED CELLULOSE FIBERS

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7 Claims. (Cl. 8—118)

1. The present application is in the nature of a continuation in part of my earlier copending application Serial No. 832,786, filed May 2, 1944, now abandoned.

Transparency fabrics, also known as organdies, have a rule been made from pure cotton materials, in particular muslin, or, more rarely, voile or other fine fabrics, such as cambric, etc. Organdies of especially fine quality were made of natural silk.

The process hereafter described relates to the production of plain or patterned, smooth or crepe transparent fabrics from materials consisting of staple fibre made from regenerated cellulose alone or of staple fibre made from regenerated cellulose and cotton, or of mixed cotton and staple fibre made from regenerated cellulose.

Various experiments were made in the past to transform textiles of this kind by the ordinary methods used for cotton fabrics. However, even by varying and adapting working conditions, such as concentration of acids and alkaline swelling agents, and the duration of the procedure, it proved impossible to turn out marketable goods.

Indeed the materials hitherto produced were horny, brittle and stiffened, and in no way suited for practical use. The present process, on the contrary, produces transparent fabrics which perfectly satisfy all requirements as to appearance, lustre, softness and durability, and show a high degree of transparency combined with a remarkable clearness of weave.

These effects are obtained by subjecting the fabric, optionally after preparatory or supplementary treatment with alkaline or acid swelling agents, first to a treatment with strong, cold alkali, then with strong, preferably cold sulphuric acid, and finally with strong, hot alkali.

The process is suitable for fabrics made of pure staple fibre made from regenerated cellulose, or woven with cotton and staple fibre made from regenerated cellulose, and also for those woven with mixed staple fibre made from regenerated cellulose and cotton yarn. Naturally materials in which any or all of the above combinations are present, either in plain or pattern weave, including of course applications with embroidery or Swiss dotted weave, can also be treated by my process.

It is advantageous to delubricate and bleach the fabric to be processed. Crude fabrics can, however, be treated in the same way. In this connection it should be borne in mind that, according to the invention, this processing is suitable for use in any phase of pre-treatment.

2. My process can be used to advantage in combination with treatment by swelling agents. The order and manner in which these treatments are applied depend on the result desired. The efficacy of the process can be heightened by repeating it wholly or in part, or applying it several times.

Between any two alkaline treatments the fabric can be rinsed or dried; between an acid and an alkaline treatment and vice versa it is best, as a rule, to neutralize the acid or the alkali. In this case also the fabric can be dried, this giving a valuable effect.

The acid treatment is carried out with sulphuric acid of 40°—52° Bé. at temperatures ranging from —5° to +20° C. The duration of the acid treatment is at least 5 seconds. Alkaline treatment is carried out with an alkali of at least 15° Bé, and lasts for a few seconds.

By alkali treatment an ordinary mercerizing treatment is understood, with alkali of at least 15° Bé., at temperatures of between —5° and +25° C., and lasting at least 5 seconds.

By hot alkali is understood a treatment according to the present process with hot alkali solution of mercerizing strength, at a temperature of 25° C. or over, having a duration of 5 seconds or more.

Patterned as well as plain transparent fabrics can be obtained with the present process by applying suitable reserves before the swelling treatment. For example Imago effects can be achieved by printing with pigments, resulting in opaque non-transparent patterns. By this method it is possible, according to the type of process chosen, to use pigment carriers proof against acid and alkaline swelling agents, such as gums or artificial resins, which result in local opaque effects, or non-acidproof thickening agents which produce stiffened transparent designs in which the effect of contrast is due to the pigmentation alone.

It is moreover possible to introduce reserves during any phase of the transforming process so as to achieve, for example, a transparent effect and then, by rinsing and subsequent swelling and shrinking, obtain the appearance of crepe. It is also possible to get intermediary effects by the imprint of swelling agents and subsequent treatment with hot alkali. The reserves can even be applied during various phases of the process in such a way that the transformed material shows untreated and swollen, that is shrunk and transparent areas one next to the other.

It is evident that by printing in color or by the use of coloured reserves such effects can be obtained in various tints.

Fabric submitted to the present process can
be dyed either before or after treatment. In this way, according to the method of procedure, the most varied results can be obtained, such as plain transparent, or, according to the different affinity for the dye caused by different local treatment, colored effects.

My process may be illustrated by means of a single example:

A fabric made from staple fibre made from regenerated cellulose is singed, bleached and tentered. It is then treated for 5 seconds with NaOH of 30° Bé. at 13° C., rinsed, neutralized and dried. Then it follows a treatment with sulfuric acid of 46° Bé. at 20° C. for 7 seconds. After being neutralized and rinsed the fabric is treated for 10 seconds with NaOH of 31° Bé. at 60° C., rinsed and neutralized. In this manner a glazed, elastic, supple transparent material is obtained.

I claim:

1. A multiple step process for obtaining transparent effects on a fabric consisting predominantly of regenerated cellulose staple fibers comprising treating said fabric with caustic soda of mercerizing strength at a temperature of -5° to 25° C. for a period of time of the order of 5 seconds, then treating said fabric with sulfuric acid of 40° to 52° Baumé at a temperature ranging from -5° to 25° C. for a period of time of the order of 5 seconds removing free sulfuric acid, and then treating said fabric with hot caustic soda of mercerizing strength at temperatures of the order of 60° C. for a period of time of the order of 5 to 10 seconds.

5. A multiple step process for obtaining transparent effects on a fabric consisting predominantly of regenerated cellulose staple fibers comprising treating said fabric with caustic soda of mercerizing strength at a temperature of -5° to 25° C. for a period of time of the order of 7 seconds and then treating said fabric with caustic soda of the order of 31° Baumé at a temperature of the order of 60° C. for a period of time of the order of 10 seconds.

6. A multiple step process for obtaining transparent effects on a fabric consisting predominantly of regenerated cellulose staple fibers comprising treating said fabric with caustic soda of mercerizing strength at temperatures of the order of -5° to 25° C. for at least 5 seconds, then treating said fabric with sulfuric acid of 40° to 52° Bé. at temperatures of the order of -5° to 25° C. for a period of time of the order of 5 to 7 seconds, and then treating said fabric with hot caustic soda of mercerizing strength at a temperature of the order of 60° C. for a period of time of the order of 5 to 10 seconds.

7. A multiple step process for obtaining transparent effects on a fabric consisting predominantly of regenerated cellulose staple fibers comprising treating said fabric with caustic soda of mercerizing strength at temperatures of the order of -5° to 25° C. for at least 5 seconds, then treating said fabric with sulfuric acid of 40° to 52° Bé. at temperatures of the order of -5° to 25° C. for a period of time of the order of 5 to 7 seconds, removing free caustic soda, then rinsing said fabric with hot caustic soda of mercerizing strength at a temperature of the order of 60° C. for a period of time of the order of 5 to 10 seconds.

Paul Walter Steinlin.

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